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The influence of global climate change on the recreational ecosystem of the North Caucasus

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Recreational ecosystems (RES) have a special place in the economy and Health Care service of Russia. According to the long-term integrated landscape monitoring in the context of global climate change there have been revealed signs of RES change in the mountainous area of the North Caucasus. They are:

• An unusual increase in the frequency of warm (from 14% to 36%) and comfortable weather (from 22% to 39%), reducing of the frequency of cool (from 41% to 17%) and cold (from 23% to 8%) weather. At the same time the frequency of abnormal weather conditions with weather pathogenicity index to 85% has increased. These conditions were associated with changes in large-scale atmospheric motion. The mentioned changes have both positive and negative effects on different structures of RES, which results to the necessity of stricter control of the situation.

• Hydrological, hydrochemical and hydrobiological regimes of peloid deposit of Tambukan lake have changed significantly (the brine level on the lake has increased by 5 m since 1973, the brine has become fresher from 81 to 25-30 g/dm3, the concentration of sulphates in brine has decreased by 24%, in slush by 32%). So we must develop special measures to regulate the above natural processes.

• Over the past decade (from 2002 to 2012), there have been significant phytocoenotic changes in the residual landscape forest ecosystem of Borgustan mountain range of the Caucasus (900-1200 m above the sea level), close to the climax phase of its development (deciduous regrowth has disappeared, organic compound of the forest ecosystem has reduced; European ash has expanded, linden, Norway maple and oak have strengthened their positions and decreased the participation of beech in the deciduary layer). Sanitary state of deciduous tree layer from the category 2.4 (weakened) deteriorated to the category 3.1 (too weakened). At the same time, the sanitary state of the second tree layer that consists of yew (Taxus baccata L.) corresponds to the category 1.1 (relative healthy). It can be expected that the given arrangement in one phytocenosis leads to the inevitable replacement of deciduous canopy as far as it decays by coniferous canopy from yew. This scenario of RES development is regarded as favourable and promising for the development of resort recreation and climate-landscape therapy (which is also confirmed by studies of the sanitate functions of volatile metabolites, natural air ionization, microclimatic differences under the canopy of the deciduous plants and yew).

The conducted studies contribute to full understanding of the influence of climate change on RES of the North Caucasus.